ABSTRACT OF THE DISCLOSURE

After stereo image is inputted (S1), the tracing point corresponding to the silhouette of a curved object observed by the stereo image is selected on the basis of the information on the present position of the object (S2), using a three-dimensional geometric model. And the corresponding points on the silhouette corresponding to respective tracing points are sampled from the stereo image (S3), and their three-dimensional coordinates are measured (S4). Then, from the group of the three-dimensional coordinates of tracing points and corresponding points, the position/posture of the object concerned and the measurement error are determined (S5), to discriminate the error (S6). In case the error is not small enough, processes starting from (S2) are repeated, regarding the detected position/posture as a renewed present position, while, if the error is small enough, processes are repeated starting from (S1), regarding the detected position/posture as a renewed present position, thereby providing the technique for high-speed tracing of three-dimensional rigid body motion of an arbitrarily-curved and smooth faced object utilizing an object model, applying a stereo camera system as sensors.